PROTOCOL

Surrogates for Non-Detects

Introduction

The following protocol has been developed in order to support the Savannah River Site environmental remediation program. The protocol applies to the processing of **non-radionuclide** data for use in the RFI/RI/BRA report. Method Detection Limits (MDLs) are commonly used as surrogates for nondetects of metals in water samples. However, for some analyses, a corrected MDL (cMDL) should be used. cMDLs should be used for soil metal determinations.[1]

Note that for background samples without any detects, the concentration value should be set equal to zero.

The cMDL takes into account sample preparation factors (SPF). The decision as to whether the MDL or cMDL should be used is made on a case-by-case basis.

Details

A. Surrogates for Samples Without SPFs

Use a surrogate value equal to one-half of the method detection limit (MDL).

B. Surrogates for Samples with SPFs

Use a surrogate value equal to one-half of the corrected method detection limit (cMDL).

[1]EPA Guidance for Data Useability in Risk Assessment, Interim final (EPA/540/G-90/008, October 1990).

An example of the use of the SPF to determine a cMDL is shown below.

EXAMPLE

Consider the determination of arsenic using an Inductively Coupled Plasma (ICP) technique from one of the laboratories used to support the RFI/RI/BRA investigation. The MDL for arsenic for the instrument in this example is 0.04 mg/L.

When a sample of soil is sent to this laboratory, it is prepared for analysis by treating a measured quantity of soil (1 gram) in a 15 ml volume of acid at elevated temperature. This acid solution is then centrifuged to settle solids. The remaining solution is then diluted up to 50 ml with clean water. A small portion of this solution is injected into the analytical instrument for measurement of the analyte concentration.

The sample preparation factor (SPF) for this example would be 50 ml / 1.0 gram (which equals 50 L/kg). Therefore, if the reading from the instrument was 10 ppm, which equals 10 mg/L, then this concentration is multiplied by 50 L/kg and the concentration in the soil would be reported as 500 mg/kg.

In order to correct the MDL for the SPF, a similar mathematical correction must be performed. Since the MDL for this instrument was 0.04 ppm (which is 0.04 mg/L) then the cMDL would be 0.04 mg/L multiplied by 50 L/kg and the result would be 2 mg/kg as shown in Table 1 below:

Table 1. Detection Limits for Arsenic in Soils by ICP

MEANING	ACRONYM	VALUE	UNITS
MDL	MDL	0.04	mg/L
Corrected MDL	cMDL	2	mg/kg